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Let ρ be the perpendicular dropped from the center of the circle on the resultant acceleration PC ; α = the angle OPC and PA , the normal acceleration.

Then from the Fig. we have

$$\rho = R \sin \alpha \dots (1).$$

From the triangle APC we have

$$\cos \alpha = \frac{AP}{PC} = \frac{V^2}{pR} \text{ or } \alpha = \cos^{-1} \left(\frac{V^2}{pR} \right) \dots (2).$$

$$p = \frac{dV}{dt} \text{ or } dV = p dt.$$

$$\int_0^V dV = p \int_0^t dt \text{ or } V = pt \dots (3).$$

Substituting for V its value in (2) and for α its value in (1) we have

$$\rho = R \sin \left[\cos^{-1} \left(\frac{pt^2}{R} \right) \right] \dots (4).$$

$\rho = 0$ and the direction of the resultant acceleration is through the center of circle when

$$\cos^{-1} \left(\frac{pt^2}{R} \right) = 1 \text{ or when } t = \sqrt{\frac{R}{p}}.$$

If it is the tangential acceleration which is constant and $= p$, then

$$\rho = R \sin \left[\tan^{-1} \left(\frac{pt^2}{R} \right) \right] \dots (5).$$

PROBLEMS.

11. Proposed by CHARLES E. MYERS, Canton, Ohio.

"A homogeneous sphere moves down a rough inclined plane, whose angle of inclination θ to the horizon is greater than that of the angle of friction; if the coefficient of friction is less than $\frac{2}{3} \tan \theta$, show that the sphere will roll and slide down the inclined plane."

12. Proposed by J. F. W. SCHEFFER, A. M., Hagerstown, Maryland.

A horizontal plane without weight is supported on three points A , B , C . A weight W is laid upon the table at a point G . If $AG = a$, $BG = b$, $CG = c$, $\angle AGB = \beta$, $\angle AGC = \gamma$; find the pressures upon A , B , C .

Solutions to these problems should be received on or before July 1st.